A Guide To Estimating Numbers and Weights Of Recycling Set-outs In Dense Neighborhoods

August 2002

Prepared for:
Recycling Program
Cambridge Dept. of Public Works
147 Hampshire Street
Cambridge, MA 02139

Prepared by:
Rick Innes
Clear View Consulting
164 West River Street
Orange, MA 01364

Printed/copied on various types of recycled paper
(20-30% post-consumer)

A Guide to Estimating Numbers and Weights
Of Recycling Set-Outs in Dense Neighborhoods

Table of Contents

IMPORTANT NOTE: Some photos of representative recyclable items and recycling setouts contained in this Guide contain identifiable product, brand, and store names. Absolutely **no** endorsement of or judgment about these products, brands, or stores on the part of any of the parties to this guide is intended or should be attributed.

A Guide to Estimating Numbers and Weights
Of Recycling Set-Outs in Dense Neighborhoods

INTRODUCTION

One of the challenges of evaluating curbside recycling programs is measuring participation rates and through them the actual amount of material being diverted per household. This information is important both for measuring the effectiveness of a program at any given time, and for evaluating the potential for increasing participation and total recycling diversion rates.

Unfortunately, only a limited amount of systematic work has been done in the area of participation rates and per-household diversion. Many communities rely on total diversion (which can be calculated from weigh slips for trash and recyclables), or on estimates of participation derived from occasional counts of setouts. It is often difficult if not impossible to make valid comparisons among different communities' program results or even between the results in one community at different points in time.

In March 2002, the City of Cambridge set out to assess the effectiveness of various outreach methods in motivating non-recycling households to start (and continue to) recycle. In addition, because some previous studies have suggested that most non-recycling households are lower generators of recyclable materials, it was decided to try to measure the per-household diversion rates of any new recycling households.

During preliminary monitoring of recycling behavior in the study area, it became apparent that counting recycling setouts would be a challenge. Due to the density of the neighborhood, there was often the potential for as many as eight or ten setouts at a given location. In addition, although some actual weighing of setouts was planned, a standardized method for estimating weights was needed for the roughly sixty percent of setouts that would not be weighed.

This Guide was developed to aid in standardizing estimating procedures among the different individuals who would be involved at different points in the study. It is hoped that it may also be useful to other, mostly urban, communities who wish to measure recycling participation and/or per-household diversion rates. While the section on numbers of setouts will generally not be needed in suburban communities, the weights section might still be useful.

A Field Summary Sheet has been included with this Guide to help with the use of these techniques during field studies. Side One of the summary recapitulates the questions one should ask in evaluating numbers of set-outs, while Side Two contains weight scales for estimating the weights of recycling set-outs.

It is important to remember that the procedures presented in this Guide are still ESTIMATING procedures. Because of the staggering variety of recycling behaviors exhibited by households in urban neighborhoods, an exact measurement of recycling setouts and participation is, practically speaking, impossible. Rather, the aim of this Guide is to IMPROVE estimating procedures and make them more COMPARABLE among different study locations, times, and individuals performing them.

After studying this guide, it is hoped that you will find uses for these techniques, or modified versions of them, in evaluating recycling participation in your community. The Recycling Staff at the City of Cambridge Department of Public Works would be interested to hear of any work you are conducting in the area of estimating participation rates. You may access the Cambridge Recycling website at www.cambridgema.gov/TheWorks/departments/recycle.

This Estimating Guide, and the recycling participation study it is a part of, were funded in large part by a grant from the Massachusetts Department of Environmental Protection. Staff time and in-kind contributions also came from the Cambridge Department of Public Works and from Clear View Consulting.

Chapter One
Estimating NUMBERS of Recycling Set-Outs

Overview of this chapter

This chapter presents a thought process for estimating numbers of recycling setouts at specific locations. In denser urban areas, this process is often difficult because the potential number of households setting out at a single location can be large (up to 10 or 12) and hard in itself to determine. The wide variety of household recycling habits, especially the tendency in two- to six-unit buildings for households to share recycling bins that are kept on a porch or other common area, adds to the challenge of compiling meaningful data.

In this chapter, a menu of questions which can be asked to improve the quality of an estimate of recycling setouts is illustrated with photographs (where possible; not all of the points lend themselves to illustration in this manner). By following a consistent and reasonably comprehensive process to arrive at estimated recycling setouts, it is hoped that estimates by different people, at different times, and/or in different communities will be more useful and comparable to each other.

After carefully reviewing this chapter, the reader should take a few more minutes to examine the photographed setouts in the practice section. Side One of the Field Summary Sheet accompanying this guide is designed to serve as a helpful reminder of the key questions to be asked when estimating numbers of setouts.

Step One:
Establish the number of households using a particular trash/recycling setout location

For any study of recycling participation, the number of possible participating households is the critical starting point. In some studies, this information will have previously been assembled, but if not (or if there is some doubt about the accuracy or completeness of the information) here are a few tips for arriving at the number of households potentially recycling at one location. In almost all cases, the number of households is derived by counting housing UNITS (apartments, condos, etc).

First, count the number of housing units in the building the setout location fronts. Doorbells and mailboxes are the usual indicators. However, in areas of less-well maintained rental housing, keep in mind that in some cases old doorbells and/or mailboxes are not always removed when new ones are installed. In uncertain cases, a backup indicator to keep in mind is the number of electric meters, or (where applicable) gas meters. (Caution: sometimes in buildings of three or more units there is a master electric meter in addition to the unit meters.) Other possible indicators might be numbers of phone hookups or cable hookups.

In dense urban areas it is important to also look for a building or buildings next to or behind the first building that may be sharing this recycling/trash setout location. In

cases where one or more such buildings exist and you cannot see another location at which they are setting out trash and recycling, count the number of units for these as well.

<u>Step Two</u>:
The most likely number of recycling setouts equals the number of recycling bins plus any distinct "non-bin" recycling setouts

This works as a starting point because two of the most common ways people set out their recycling are (1) the way they are asked to, with their containers in a recycling bin and their paper in a bag or bags next to the bin, and (2) if they only have paper, in a bag by itself.

When canvassing a location, be sure to look for recycling setouts on <u>all</u> sides of the trash setout, and nearby (some people always set their recycling out somewhat separated from the trash). When checking a corner building, it is wise to check on both streets, because sometimes one resident may set out their recycling at a completely different location from others in the building.

The definition of a "non-bin" recycling set-out is generally that it must be a material(s) accepted in the recycling program that is set out separate from the trash and in a form and manner that is (reasonably) collectable for recycling:

1. The most common "non-bin" setout is a bag or bags of paper. The first photo shows the "classic" (and easiest to interpret) kind of "non-bin" setout: a single bag of paper leaning against a pole by itself and nowhere near another recycling setout.

2. The second photo shows three bags of paper: two of similar appearance and one quite different. Depending on the context, this could reasonably be interpreted as TWO "non-bin" setouts.

NOTE: many "non-bin" setouts of paper are in plastic bags, which are officially not accepted in most recycling programs. However, just as paper in a plastic bag would be collected as part of a "regular" recycling setout, it generally will be collected as a "non-bin" setout (assuming the recycling truck driver can see it). Therefore, it should be counted as a setout.

3. The rules for when to count corrugated cardboard as a "non-bin" setout parallel those for when to count corrugated cardboard as a recycling setout in general. It must be flattened and if necessary cut down so that it is no larger than 3 feet by 3 feet. Ideally it should be tied in bundles or placed so that a bin or other heavier item is holding it down and preventing it from blowing. In the case of a potential "non-bin" setout, if flattened corrugated is being held down by trash, it is not reasonably collectable and would not count as a setout. If, however, it is wedged between a bin or barrel and a pole, it is collectable and should be counted as a setout. Unflattened corrugated boxes should never be counted as a recycling setout.

4. Another type of "non-bin" setout involves boxes or bags of mixed recyclable containers. These are sometimes set out by people who have lost their recycling bin or who do not know how to get a recycling bin. A key to judging whether to count these as recycling setouts is whether it appears there has been effort made to prepare the materials for recycling. Thus, a bag (even plastic ones, see those in the foreground of photo) of mixed containers may reasonably be thought to be intended for recycling if all the containers are clean. If the containers are dirty (food residue, etc), it may be just a coincidence that the items are those accepted for recycling, and the bag is probably best not counted as a recycling setout. Many people also set out containers for recycling in boxes or bins they have purchased themselves. If the box or container has been clearly marked "Recycling" as many cities and towns encourage residents to do, it should be counted as a regular "bin" setout. If unmarked, but reasonably able to be collected, it counts as a "non-bin" setout (see photo – this is a rather marginal "recycling set-out" since if seen only from the side it would appear to the recycling truck driver to be a regular trash barrel).

5. A final category of "non-bin" recycling setout which is occasionally encountered is the bag with a mix of paper and containers. While not technically in compliance with the rules of most recycling programs, some recycling truck drivers will collect this type of set-out if it is not too difficult to sort the containers from the paper. So, if this type of set-out is separate from the trash and consists of properly prepared items that suggest an intent to recycle, it is fair to count this as a "non-bin" set-out.

<u>Step Three</u>:
Review the possibilities that there may be MORE or FEWER recycling setouts than there are bins. Begin with the possibilities that there may be MORE:

a) As suggested above, there may be one or more "non-bin" setouts at the same location as a bin or bins, but set out by a different household. In the example shown in the photograph, the original setout appears to have been the recycling bin plus the corrugated box plus the 3 bags all neatly stacked. The other two bags are different in appearance and setout approach and may in fact be two "non-bin" setouts, but should at least be counted as one.

b) Another important factor, known mostly from anecdotal evidence is "bin-sharing", in which a person from one household who has very little to recycle in a given week simply adds their materials to a neighbor's bin. This phenomenon is difficult to be sure of, but it is certainly worthwhile to look for indicators:

1. One form of bin sharing involves a bag (often a plastic one) of materials added to a bin of otherwise all loose items. This is easier to be sure about when the mix of materials is obviously different from those in the bin. (In the example shown in the photo on the next page, a bag of containers has been added on top of the loose containers and bag of paper that were in the bin in the foreground.)

2. Another indicator to look for is dirty/ poorly prepared materials thrown in with otherwise neat and clean items (note the 3 <u>filthy items</u> at the front of a bin of otherwise clean items in the photo below). Rarer, but still a possibility, would be a few neat, clean items thrown in on top of a bin full of dirty, poorly prepared items.

3. Another option, if you suspect bin sharing may be involved in a set-out, is to look for <u>readily visible</u> addresses which might indicate material from different units. (Generally, it is NOT a good idea to go poking through the materials in a bin or bag, but sometimes addresses are visible.)

4. Unless there is really clear evidence of more than one additional household sharing a bin, it is best to assume only one additional household setout.

Next, review the possibilities that there may be FEWER recycling setouts than there are bins:

a) Some households use one bin for paper and one for containers. With limited amounts of material in each bin, this situation is quite likely to be a single setout, as illustrated in the photograph to the left. In this type of situation, when the bins are full, it could either be one setout from a large household or an instance of bin sharing, as in the photograph at the top of the next page.

b) Look at the mix of materials in bins. Two bins of containers with a nearly identical mix of materials may very well represent one set-out from a large household or one that does not recycle very often. (But it could also mean bin-sharing, so check for cleanliness differences or other signs of bin-sharing). (In the photo below, there are many common item types in both bins: wine bottles, milk jugs, steel food cans – prepared the same way, with labels removed, juice bottles, etc.)

c) Look for address/unit # labels on the bins. If there are two bins with the same unit # on them, there is a good chance (but not a certainty) that they are from the same unit. If bins at a multi-family building are labeled, but only with the street address and no unit numbers, there is some chance that bins are being shared.

<u>Step Four</u>:
In light of the above, decide on the MOST LIKELY number of recycling setouts.

a) There is a real chance that more than one of the above factors will seem to apply to any given setout situation, and even that some indicators will point in opposite directions.
b) Decide how strongly each indicator seems to apply, and whether they "net out" (i.e., one indicator says "+2" while another says "-1", resulting in "+1") to more, fewer, or the same as the number of recycling bins and non-bin setouts.
c) Remember, short of interviewing the people in the building, all anyone can do is ESTIMATE the number of recycling set-outs from (sometimes limited) available evidence, so make your best estimate and move on to the next set-out location!

NOTE: Side One of the Field Summary Sheet that accompanies this guide is designed to serve as a brief reminder of the points discussed and illustrated above.

Chapter Two
Estimating WEIGHTS of Recycling Set-Outs

Overview of this chapter

This chapter presents an estimating procedure for weights of recycling setouts. As with all estimating procedures, it involves trade-offs between accuracy (and a high number of rules and numbers to remember) and simplicity (but with much less accuracy). This system was derived from extensive weighing of representative recyclable items at the Cambridge Recycling Drop-Off Center, supplemented with field weighing on several Cambridge streets. The following sections discuss the types of materials found in recycling setouts, and their typical weights, first for the "paper" fraction and then for the "containers" fraction. In each case, after introductory discussion, illustrated with photos, a procedure is presented for estimating that fraction of a recycling setout. Side 2 of the "Field Summary Sheet" provided with this Guide will aid the reader in using these procedures.

Paper Set-Outs (or portions of)

While there are quite a number of paper (and cardboard) types that might be found in any given recycling set-out, this estimating system boils them down to four main categories by density: Newspaper, Mixed Paper, Corrugated Cardboard, and Magazines. A majority of paper set-outs are in bags, which have been grouped into three sizes for relative simplicity: large grocery-type bags (or larger), small "six-pack" paper bags (or smaller), and all other bags in between. Some illustrations follow:

The first example at left is a generic standard-size grocery bag, categorized "Large" in this estimating system. It is obviously well filled with virtually all newspaper, in this case measuring seven inches thick. It weighed 17.4 pounds.

The second example at left is another type of large grocery bag commonly found in the Cambridge area. It was less full (only five inches thick when manually com-pressed), again with newspaper, although there was a bit more of other types of paper included. It weighed 11.0 pounds.

The next example at left is a medium-size paper bag, filled somewhat loosely with a majority of newspaper, and various other types (notably junk mail and boxboard). When manually compressed, this material was 3.5 inches thick. It weighed 6.6 pounds.

The plastic bag next to the trash barrel at left is fairly typical of smaller "non-bin" recycling setouts in cities like Cambridge. It contained a majority of newspaper, but also 2 small magazines, 2 small kraft bags, and 1 boxboard item. It weighed 2.4 pounds.

The next example is of a smaller, "six-pack" bag, which is holding almost exclusively newspaper in this case (usually, when these smaller bags are encountered, they hold mixed paper such as junk mail). This paper setout was six inches thick and weighed 6.5 pounds.

The example at right, while obviously including several bags of paper, also includes the other way paper is sometimes set out: loose in a recycling bin. When a smaller bin (12 to 15 gallons) is used in this way, the density of paper is comparable to that found in large grocery bags; obviously in a larger bin the weight per inch of thickness would be greater.

Our final example of a paper setout is a stack of flattened, loose corrugated cardboard. When manually compressed, this stack was about four inches thick. It weighed 7.6 pounds.

Summary of Weight Estimating Procedure for Paper Portion of Recycling Set-Outs

A (somewhat) simplified field estimating procedure has been developed based on the above examples and some additional field-testing of actual weights versus bag sizes and thickness. It does have to be carried out for each individual bag (or bin of loose paper) at a set-out location, but can be done fairly quickly by sticking with first impressions and avoiding over-thinking any single point.

First, categorize the bag or bin of material to be estimated into one of the four primary paper categories:

1. Newspaper: any bag that has a majority of newspaper, even if it contains a few items of other types
2. Magazines: any bag that is mostly magazines. These are not common.
3. Corrugated cardboard: this refers only to loose piles or tied bundles of flattened corrugated, and by definition should contain trivial quantities of other paper types.
4. Mixed Paper: any bag with a mix of paper that does not fit the other categories. This would include junk mail, white paper, boxboard (i.e., cereal box-type cardboard).

Second, identify the general bag size holding the paper, using the following three categories:

1. Large Grocery Bags: any standard large grocery bag (generally, these are 12" wide by 16-18" high), or any larger bag. Loose paper in a bin would be counted here.
2. Small Paper Bags: any bag of the "six-pack" variety (generally, these are 8" wide by 12-15" high), or any smaller bag
3. Medium-Size Bags: Any bag, including many common types of plastic bags (most often grocery), which falls in between the other two categories in the volume of material it can hold.

Third, measure (or estimate) the thickness of the bag or stack of material in inches. If the material is loose, compress it with your hands or visually estimate how thick it would be if compressed. If the material is in a medium-size bag, calculate what ¾ of that thickness would be (for example, a bag 6 inches thick would be counted as 4.5 inches). If the material is in a small bag, calculate what ½ of the original thickness would be.

(It will be rare, but for corrugated cardboard follow a similar procedure. The densities in the estimating chart are based on a relatively large (2-3' square) stack. If the pieces are only half that size on average, adjust your thickness estimate to half accordingly.)

Fourth, look up the material and thickness in Chart C of the Field Summary Sheet. The estimated weight in pounds will be on the right-hand side of the appropriate line for that material and thickness.
NOTE: this estimating procedure is not designed to take into account any added weight from any or all of a paper set-out getting wet, because no simple method could be devised to do so. As such, this procedure will produce lower weights than actual weighing on rainy days (or after rainy nights).

Container SetOuts (or portions of)

The potential array of types and sizes of materials in the "containers" portion of a recycling set-out makes the "paper" portion discussed above look simple. However, the key is to prioritize by size & density; and above all don't get bogged down with counting every item (many small, low-density items contribute almost nothing to the overall weight of the set-out).

Glass items dominate this category by weight but not by item count. At left are three typical sizes of glass bottles with weight data from samples at the Cambridge Recycling Drop-Off: wine bottles (average 1.16 pounds, range 0.94-1.25); medium-size bottles (average 0.82 pounds, range 0.72-0.94); and smaller jars (average 0.46 pounds, range 0.34-0.59). Laundry detergent bottles are the only other item in glass' weight class.

The heaviest type of metal typically found in recycling set-outs is steel cans, some of which are illustrated at left. Medium-size steel cans such as the two on the right had an average weight of 0.22 pounds (range 0.2-0.25 pounds), while smaller cans had an average weight of 0.12 pounds (range 0.08-0.16 pounds).

Aluminum cans and other products are much lighter. In the tests at the Cambridge Recycling Drop-Off, cans (mostly soft drinks, some small juice cans like the one at the far left) averaged 0.05 pounds (range 0.04-0.06). Aluminum pie plates and similar items averaged 0.04 pounds (range 0.03-0.05). Crumpled aluminum foil averaged 0.01 pounds (range 0.01-0.03).

Plastic items are the most numerous and varied category found in most recycling set-outs. The first category of these is the regular (or translucent) HDPE bottles. Gallon milk/water jugs averaged 0.15 pounds (range 0.14-0.16). Half-gallon jugs averaged 0.12 pounds (range 0.11-0.17). Smaller bottles such as the two at left averaged 0.07 pounds (range 0.04-0.09).

A second category of plastic items is colored HDPE bottles. As noted above, larger HDPE detergent bottles were the only items to rival (small) glass bottles, averaging 0.45 pounds (range 0.33-0.59). Smaller detergent bottles were comparable to half-gallon milk jugs, while small colored HDPE bottles were comparable to the small regular HDPE bottles.

A third category of common plastic items is PET or PETE bottles (usually clear). Large PET bottles averaged 0.20 pounds (range 0.14-0.25). Medium and smaller PET bottles averaged 0.10 pounds (range 0.04-0.13).

A final category of plastic items to be considered is commonly called "tubs", also including yogurt containers and small microwave oven trays. In tests at the Cambridge Recycling Drop-Off, microwave trays averaged 0.05 pounds (range 0.04-0.06). Medium-size tubs like the one at right averaged 0.04 pounds (range 0.04-0.06). Smaller tubs and yogurt containers averaged 0.03 pounds (range 0.02-0.04).

One additional category in the containers fraction of recycling setouts is cartons & aseptic packages ("juice boxes"). This category averaged 0.16 pounds (range 0.09-0.21). It is worth noting that the smaller "juice boxes" would weigh less, but are not commonly found in residential recycling.

Weight Estimating Procedure for Container Portion of Recycling Setout

Based on the analysis of common container types in recycling set-outs summarized above, the following simplified field estimating procedure has been developed. If used carefully, it should generally produce weight estimates within 2-5 percent of actual weighing results.

First, COUNT the glass bottles and any large laundry detergent bottles in the bin you are estimating. If the bin is fairly full, you may need to "poke around" the bin to be sure you find all the glass items. Adjust this estimate by only counting small glass jars and laundry detergent bottles as half a bottle. (It won't be common, but if you encounter really large glass bottles in the gallon range, these should be counted as two bottles.) When you have arrived at your adjusted "count", look it up in Chart A of the Field Summary Sheet. The weight in pounds will be on the right-hand side of the appropriate line for that item "count".

Second, ESTIMATE the number of other container items (metal cans, plastic, cartons, etc) in the bin you are working with. Adjust this estimate slightly upward if you are seeing more relatively heavy items such as steel cans. Adjust your estimate slightly downward if you are seeing mostly small, lighter items such as aluminum and smaller plastic containers. Look up your estimated count in Chart B of the Field Summary Sheet. As before, the weight in pounds will be on the right-hand side of the appropriate line for that estimated "count".

Third, add the two weights together to obtain the total weight for the containers in the bin. Repeat the procedure as needed for other bins and/or bags in the recycling setout. (NOTE: depending on the specific procedure for a given recycling study, you may simply write down individual weights, and add them together later on.)

Examples of Set-Out Mixes

To help illustrate the above procedure, six examples are presented below. These "set-outs" were assembled at the Cambridge Recycling Drop-Off. Items were counted and actual weights obtained to allow some basis for comparison between the estimating procedure and actual weighing.

Example 1: included 1 wine bottle, 1 small glass jar, 2 steel cans, 1 carton, and 4 miscellaneous plastic items.
Estimated Weight: 2.35 pounds
Gross Weight: 5.8 pounds
Tare (Box) Weight: 3.6 pounds
Actual Net Weight: 2.2 pounds

Estimate was +7% of actual

Example 2: included 2 wine bottles, 2 small glass jars, 3 steel cans, 2 cartons, and 8 miscellaneous plastic items.
Estimated Weight: 4.6 pounds
Gross Weight: 9.6 pounds
Tare (Box) Weight: 4.8 pounds
Actual Net Weight: 4.8 pounds

Estimate was –4% of actual

Example 3: included 2 wine bottles, 1 medium bottle, 2 small glass jars, 5 steel cans, 2 cartons, 2 aluminum items, and 12 miscellaneous plastic items.
Estimated Weight: 6.5 pounds
Gross Weight: 11.2 pounds
Tare (Box) Weight: 4.8 pounds
Actual Net Weight: 6.4 pounds

Estimate was +2% of actual

Example 4: included 3 wine bottles, 1 medium bottle, 2 small glass jars, 5 steel cans, 2 cartons, 4 aluminum items, and 15 miscellaneous plastic items.
Estimated Weight: 8.1 pounds
Gross Weight: 12.8 pounds
Tare (Box) Weight: 4.8 pounds
Actual Net Weight: 8.0 pounds

Estimate was +1% of actual

Example 5: included 3 small glass jars, 5 steel cans, and 12 miscellaneous plastic items.

Estimated Weight: 3.35 pounds
Gross Weight: 8.2 pounds
Tare (Box) Weight: 4.6 pounds
Actual Net Weight: 3.6 pounds

Estimate was –7% of actual

Example 6: included 2 cartons and 15 miscellaneous plastic items.

Estimated Weight: 1.7 pounds
Gross Weight: 6.2 pounds
Tare (Box) Weight: 4.8 pounds
Actual Net Weight: 1.4 pounds

Estimate was +21% of actual. (Many of the plastic items were on the small side; this illustrates why the instructions include "fudging" downward the item estimate for smaller items.)

Chapter Three
Practice Estimating Numbers and Weights of Setouts

In this section, you have the opportunity to put the estimating techniques presented earlier to the test. While these photographs and limited information are no substitute for practicing in the field, they provide a way to see if these techniques are working for you. The answers to the questions posed next to each photograph are on the cards in the pocket inside the back cover of this Guide. The cards are numbered according to the page they "answer" (card 17A for page 17, etc).

HOW MANY SETOUTS?

Helpful hint: only 3 households appear to set out at this location

HOW MANY SETOUTS?

(This is a hard one)

Potential of 8 households setting out at this location

HOW MANY SETOUTS?

There are containers in the bin under the paper bag.

All three bags are from different stores.

Potential of 4 households setting out at this location.

HOW MANY SETOUTS?

Potential of 6 households setting out at this location.

HOW MANY SETOUTS?

Potential of 3 households setting out at this location.

2 bags of paper plus the containers are in the bin, a couple more containers in the next bag back, bags are very loosely packed.

HOW MANY SETOUTS?

Potential of 3 households setting out at this location.

In addition to the bin of containers, there are 4 tied bundles of news-paper and 4 large bags of mixed paper.

HOW MANY SETOUTS?

3 bins of containers plus 6 bags of paper (2 of them in the rear bin)

Potential of 5 households setting out at this location.

HOW MANY SETOUTS?

Potential of 3 households setting out at this location. No markings on bins.

HOW MANY SETOUTS?

Potential of 3 households setting out at this location. Plastic bag at front of bin contains other plastic bags and 3 dirty containers; other containers in bin are fairly clean.

CALCULATE WEIGHT OF SET-OUT

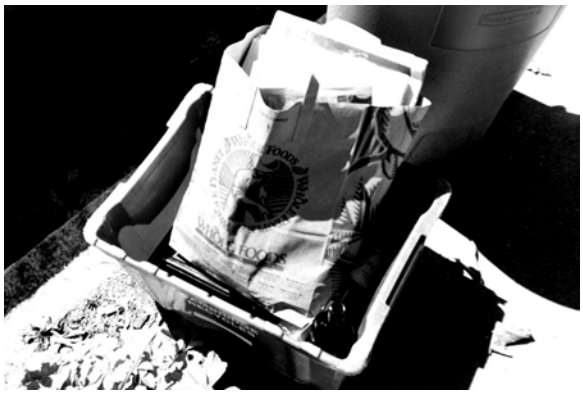
(1) Large grocery bag of mostly newspaper, approx. 3" thick when manually compressed
(2) Smaller bag of containers, including: 2 small glass jars, 3 yogurt containers, 3 microwave trays.

CALCULATE COMBINED WEIGHT OF SET-OUTS:

(1) Bin contains 3 wine bottles, 2 other medium-large bottles, 3 steel cans, 4 aluminum pie plates, and approx. 10 plastic items
(2) Six bags of paper as follows:
    a) large grocery bag, mixed paper, 3.5" thick
    b) large grocery bag, newspaper, 5.5" thick
    c) large grocery bag, cereal boxes and junk mail, 3" thick
    d) 3 large grocery bags, majority newspaper, 2", 3", 3.5" thick

CALCULATE WEIGHT OF SET-OUT

1) 2 wine bottles, 3 small glass jars, 1 laundry detergent bottle, approx. 12 plastic items
2) Regular grocery bag of newspaper, 4" thick
3) Large grocery bag of mixed paper, 2" thick



CALCULATE WEIGHT OF SET-OUT

(1) Large grocery bag contains majority newspaper; 5" thick
(2) Bin contains 4 wine bottles, 1 other large bottle, approx. 10 plastic and metal items

CALCULATE WEIGHT OF SET-OUT

(1) Containers in left bag, top of right bag, and bottom of bin total about 12 plastic items
(2) Approx. 6" thick loose newspaper in bin
(3) Two large grocery bags of mixed paper, 3" and 3.5" thick
(4) Mixed paper in top bag 4" thick, but only in bottom of bag (equivalent to a small bag)

CALCULATE COMBINED WEIGHT OF SET-OUTS

(1) Top bin has one laundry detergent jug and about 10 miscellaneous containers, most of them fairly large
(2) Bottom bin has two large bottles, three small glass jars, and about 15 miscellaneous plastic items
(3) Front bag is mixed paper, 4"
(4) Second bag is newspaper, 4.5" thick
(5) Back bag is magazines, 4" thick

CALCULATE WEIGHTS OF TWO SET-OUTS SEPARATELY

(1) Rear set-out has 2 small glass jars and about a dozen mostly small plastic items, topped by a large bag of mixed paper 2" thick and a medium bag of mixed paper 4" thick
(2) Front set-out has 2 wine bottles, a laundry detergent bottle, and about 10 misc. plastic & metal items; one bag of newspaper 5" thick, and 3 bags of mixed paper 3", 3.5", and 5" thick

CALCULATE WEIGHT OF SET-OUT

(1) Plastic bag has about a dozen plastic bags and two small glass jars and a plastic tub, all fairly dirty
(2) Regular grocery bag is almost all newspaper, about 4" thick

CALCULATE WEIGHT OF SET-OUT

(1) Small bin in front is mostly newspaper, and is about the size of a medium bag. Extra material crammed in top means total thickness is about 7"
(2) Recycling bin holds a laundry detergent bottle, 5 small glass jars, and about a dozen miscellaneous plastic & metal items, mostly large

Answers to Practice Photos

(1) Count this as TWO setouts despite the 4 bins. The front setout has containers in the top bin and paper in the lower bin, the back setout is reversed. There are limited quantities of materials in all 4 bins.

(2) Probably there are FOUR setouts here. The two-stacked bins have containers in the top, paper in the bottom, and are probably one setout. The bin at front right and the bin at back right both have paper on top of containers, and are probably each separate setouts. The wastebasket at extreme right has paper only, but can reasonably be assumed to be a separate setout.

(3) The paper on top of containers in the bin is probably one setout, but the quantity of materials and the different bag sources suggest a reasonable likelihood of a second set-out. There is some chance that EACH of the bags at left is a separate set-out; no addresses were visible to support this possibility and the quantities of paper are not that large, so the safest conclusion is TWO set-outs at this address.

(4) The paper and corrugated squeezed between the trash and the telephone pole look like one setout. The two bags in front look like they were added later and might even be two separate setouts, but it would be a safer bet to count them as one more. Total of TWO setouts.

(5) This could all be one setout, but the amount of material and the fact that there are containers in both the bin and one of the other bags give a reasonably solid chance that this is TWO setouts.

(6) This could potentially be one setout from either a large household or one that does not recycle much. The fact that all the newspaper is bundled and all the other mixed paper is in bags could support this. On the other hand, 4 different bags of mixed paper raise at least a slight possibility that all 3 households have set out some material. After looking for visible addresses (there were none in this case), the safest conclusion is TWO setouts.

(7) In this case, the most likely conclusion is that the number of setouts matches the number of bins, THREE. The front bin has containers only and is followed by two bags from the same store. The second bin also has containers only, with two bags in front of it that are different from the first two bags. Both of these setouts are "by the book", whereas the back bin has bags of paper on top of containers.

(8) This is a case where looking for similarities or differences in the types and/or cleanliness of materials is important. In this case, the bin on the right has several wine bottles in it, whereas the one on the left has none. That, plus the quantities of materials, is enough to support a conclusion of TWO setouts.

(9) Again, the types and especially the cleanliness of materials is key to interpreting this situation. The loose containers in the bin are by and large clean and properly prepared, and more importantly, all prepared the same. The plastic bag of dirty items was almost certainly thrown in later. TWO setouts.

Answers to Practice Photos

(10) Bag of newspaper: 7.05 lbs
Containers: 1.7 lbs
(2 small = 1 glass = 1.1 lbs; 6 other = 0.6 lbs)
Total Setout = 8.75 lbs

(11) Paper Total 44.94 lbs
(Bag #1 = 6.48 lbs, Bag #2 = 12.93 lbs, Bag #3 = 5.55 lbs, Bag #4 = 4.7 lbs, Bag #5 = 7.05 lbs, Bag #6 = 8.23 lbs)
Containers: 7.2 lbs
(5 glass = 5.5 lbs, 17 Other = 1.7 lbs)
Total at this location = 52.14 lbs

(12) Paper Total 13.1 lbs
(Bag #1 = 9.4 lbs, Bag #2 = 3.7 lbs)
Containers: 5.6 lbs
(4 glass (2 + (4 * .5)) = 4.4 lbs; 12 Other = 1.2 lbs)
Total Setout = 18.7 lbs

(13) Paper = 11.75 lbs
Containers = 6.5 lbs
(5 Glass = 5.5 lbs, 10 Other = 1.0 lbs)
Total Setout 18.25 lbs

(14) Containers = 1.2 lbs
(12 Other)
Paper Total = 29.83 lbs
(Loose in bin = 14.1 lbs, Bag #1 = 5.55 lbs, Bag #2 = 6.48 lbs, Bag #3 = 3.7 lbs)
Total Setout = 31.03 lbs

(15) Containers = 7.1 lbs
(Bin One: .5 "glass" = .55 lbs, **12** Other (mostly large items) = 1.2 lbs; Bin Two: 3.5 glass = 3.85 lbs, 15 Other = 1.5 lbs)
Paper Total = 33.98 lbs
(Bag #1 = 7.4 lbs, Bag #2 = 10.58 lbs, Bag #3 = 16.0 lbs)
Total Setouts = 41.08 lbs

(16) Rear Set-Out:
Containers = 2.1 lbs
(1 glass = 1.1 lbs, **10** other (mostly small) = 1.0 lbs)
Paper Total = 9.25 lbs
(Bag #1 = 3.7 lbs, Bag #2 = 5.55 lbs)
Total Setout = 11.35 lbs

Front Setout:
Containers = 3.75 lbs
(2.5 glass = 2.75 lbs, 10 Other = 1.0 lbs)
Paper Total = 33.03 lbs
(Bag #1 = 11.75 lbs, Bag #2 = 5.55 lbs, Bag #3 = 6.48 lbs, Bag #4 = 9.25 lbs)
Total Setout = 36.78 lbs

(17) (Trick Question)
The total setout weight should be the weight of the bag of paper (9.4 lbs). The plastic bag has enough things wrong with it that it should be treated as trash.

(18) Paper = 11.75 lbs
(.75 * 7" = 5.25; use 5")
Containers = 4.7 lbs
(3 "glass" = 3.3 lbs, **14** Other (mostly large items) = 1.4 lbs)
Total Setout = 16.45 lbs